Civil & Environmental Consultants, Inc.

Challenges of Early Closure of Landfills

TDEC-Environmental Show of the South

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Introduction – What is Early Closure?

▶ Definition:

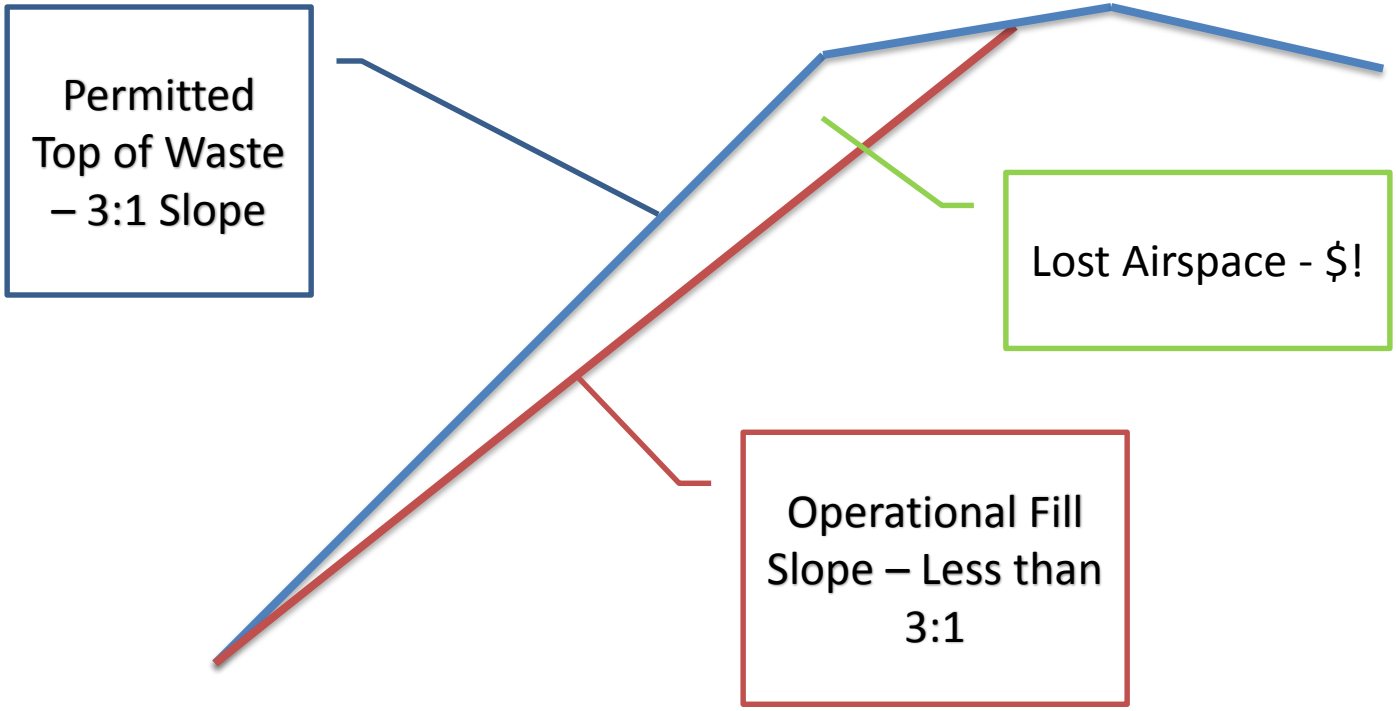
- Capping at least a portion of a facility prior to reaching final grades
- Can be lateral or vertical

Introduction – What is Early Closure?

Causes:

- **Vertical Early Closure**
  - Not filling to permitted top of waste elevations
  - Settlement
- **Lateral Early Closure**
  - Not constructing full permitted footprint
  - Mothballing – Corporate Strategy
  - Financial Issues – Site Abandonment

Vertical Early Closure – What we mean



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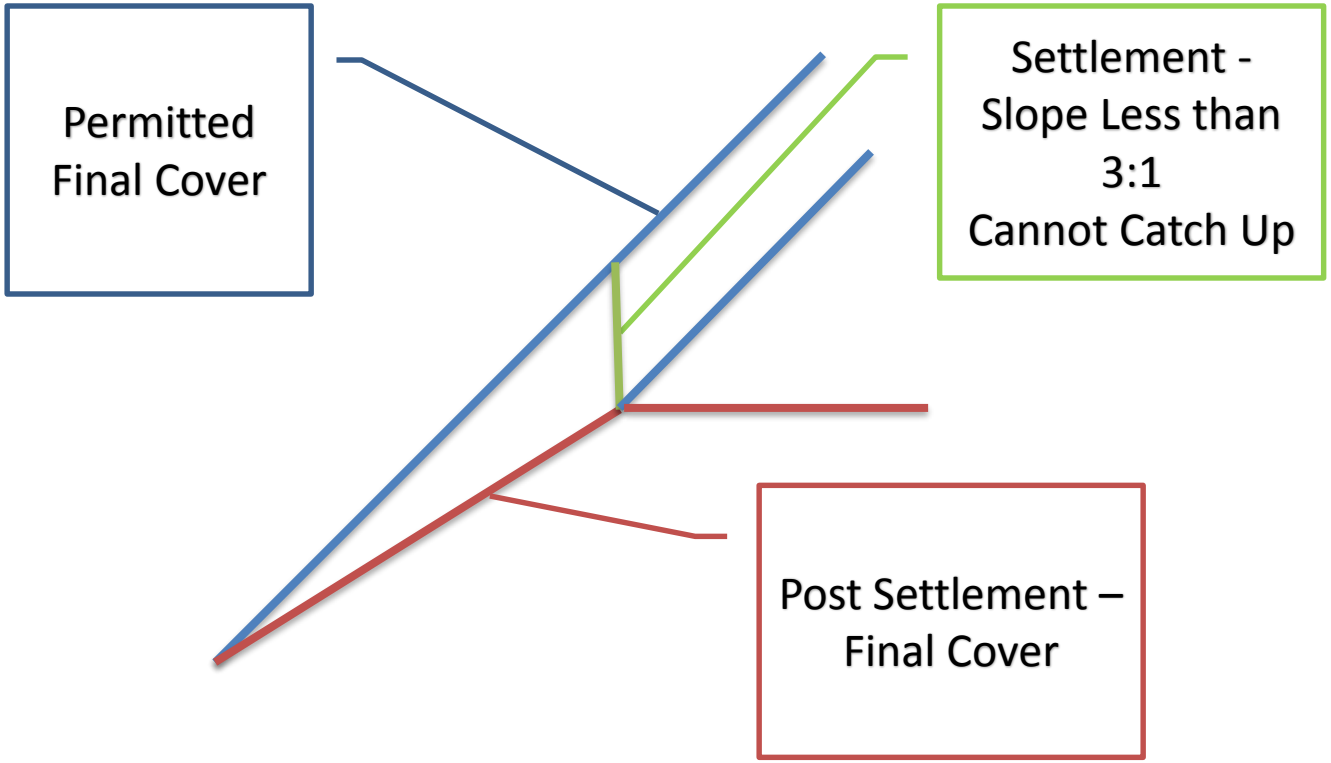

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Vertical Early Closure – Potential Problems

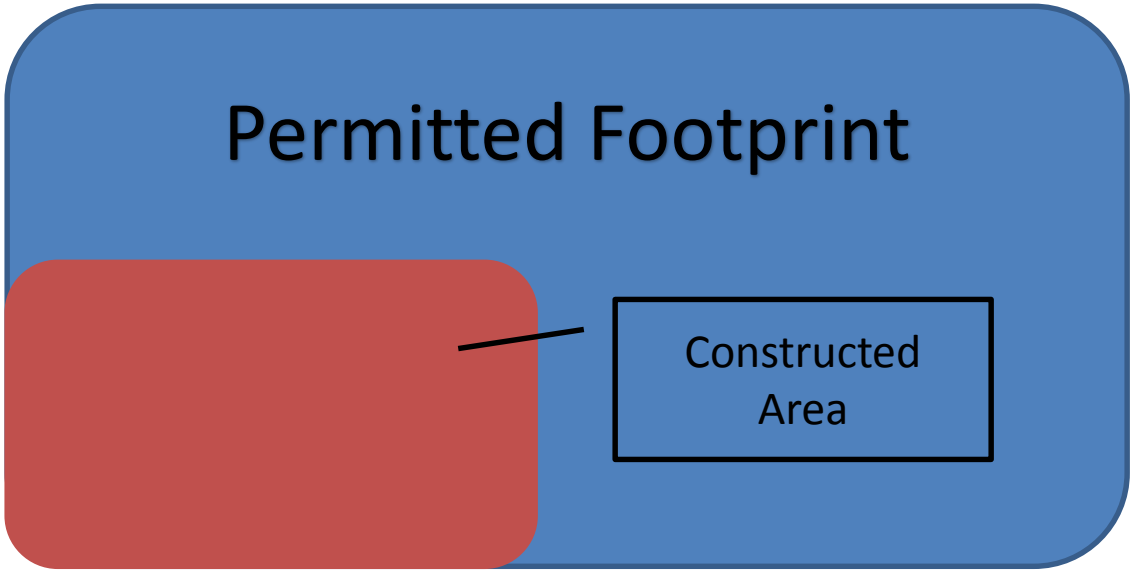
- **Lost Airspace – Revenue Loss**
- **Stormwater Design Impacts**
  - Diversion berms and downchutes may need to be addressed
- **Landfill Gas Collection System Impacts**
  - Reduction in collection capabilities

Vertical Early Closure – Potential Issues (cont'd)

▶ Stability Concerns - Veneer

- Design is for 3:1 but slopes less
  - Increased infiltration vs. runoff
  - Decreased flow in geocomposite drainage layer
  - Significant reduction in forces
- Probably no decrease in safety factor but designer should verify
  - Geocomposite could be inundated without failure

Lateral Early Closure – What we mean



Lateral Early Closure – Potential Issues

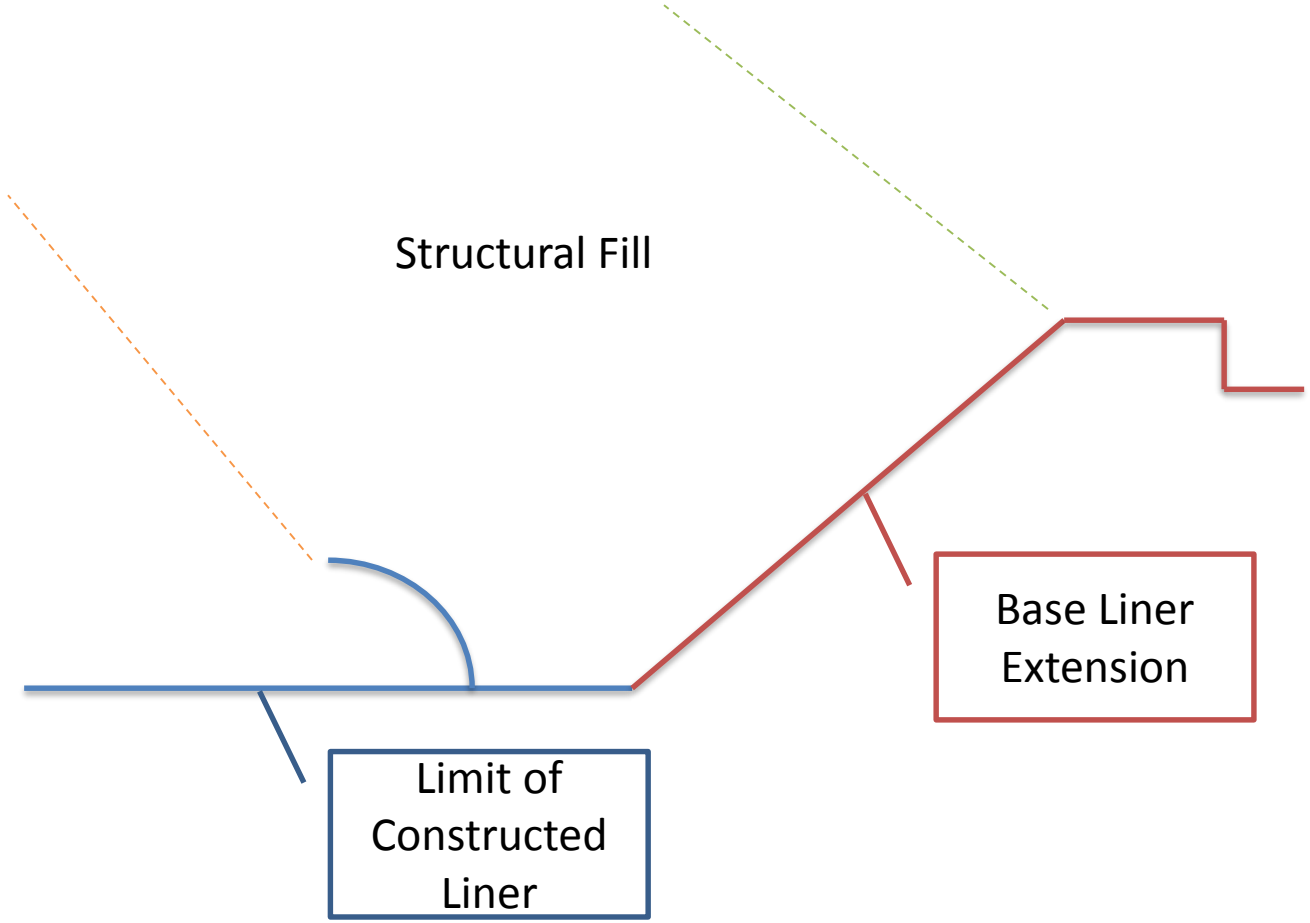
▶ Internal Slopes

- Internal slopes should not exceed external slopes
- Fill areas should not be overfilled to extend constructed remaining life – need for a new cell
- Slopes should not be overfilled anticipating settlement

Lateral Early Closure – Potential Issues (cont'd)

- **If slopes exceed cap design criteria:**
  - Move waste – Costly, odorous, and may not have anywhere to move it
  - Find alternate design for cap – Permitting issues, costly
  - Extend the base to allow cap design criteria to be met

Lateral Early Closure – Base Liner Extension



Lateral Early Closure – Potential Issues (cont'd)

► Stormwater

- Site drainage patterns will not be as initially designed
- Potential increased loading to existing ponds/not all ponds constructed
- Diversion berms and downchutes required where not initially designed
- Potentially need to redesign entire system for new conditions

Lateral Early Closure – Potential Issues (cont'd)

▶ Landfill Gas Collection System

- Well spacing/depth likely impacted
- Header closed loop will be impacted
- Blower/Flare sizing – may have larger infrastructure than needed
- Potentially need to redesign entire system for new conditions

Lateral Early Closure – Potential Issues (cont'd)

▶ Leachate Management

- Seeps and outbreaks – design considerations
- Probably, minimal impacts…probably
- Rainflaps – impact on final cap tie-in design
- Base Liner Extension

Lateral Early Closure – Potential Issues (cont'd)

▶ Stability

- Likely need to re-evaluate static and seismic stability for new conditions
- Base Liner Extension

Prevention of Potential Issues

▶ Employ Good Filling Practices

- Proper slopes
- Proper compaction
- Proper daily and intermediate cover

▶ Plan Ahead

- Start thinking about capping years in advance
- Know your filling plans in the near and long term – cap sequence plans
- Survey, Survey, Survey

Lessons Learned

- Know how much leachate is in the landfill!
- Know the characteristics of the leachate!
- No slopes steeper than 3:1!
- Ensure that closure/post-closure costs are accurate!
- Confirm availability of soil for cap construction!

Questions?

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